ABSTRACT OF THE DISCLOSURE

A method and apparatus for reducing the parachuting of a probe used in an atomic force microscope. The apparatus includes an oscillating probe, a phase detection circuit coupled to the oscillating probe, and a probe drive boosting circuit coupled to the phase detection circuit and the probe, wherein the phase detection circuit detects a reduction of a variation of a phase signal from the probe and the probe drive boosting circuit boosts a signal to the probe based on the phase signal detected by the phase detection circuit to produce a boosted probe drive signal. The phase detection circuit includes a precision full wave rectifier, and an envelope detector coupled to the precision full wave rectifier, wherein the precision full wave rectifier rectifies a phase signal of the probe to produce a rectified phase signal and the envelope detector detects the rectified phase signal to produce an envelope detected signal. The phase detection circuit further includes a comparator coupled to the envelope detector, and an event detector and hold off circuit coupled to the comparator, wherein the comparator and the event detector and hold off circuit generate an event signal from the envelope detected signal.